

REMARKS

Applicants submit this Amendment, with a Request for Continued Examination, in reply to the final Office Action mailed November 26, 2004.

As an initial matter, Applicants would like to thank the Examiner for conducting an Interview with Applicants' representative on April 29, 2005. The matters discussed in the Examiner Interview are included in the following remarks.

By this Amendment, Applicants amend claim 20. No new matter has been introduced.

Before entry of this Amendment, claims 1-2, 5-8, 12-18, and 20-25 were pending in this application. After entry of this Amendment, claims 1-2, 5-8, 12-18, and 20-25 would still be pending in this application. Claims 1, 7, 13, 20, 21, and 23 are the sole independent claims.

On page 2 of the final Office Action, claim 20 was rejected under 35 U.S.C. §112, second paragraph for alleged indefiniteness. Applicants have amended claim 20 to recite that "said plasma process is implemented while increasing the oxygen added into the process gas and while decreasing the oxygen added into the process gas." Accordingly, Applicants respectfully request withdrawal of the Section 112, second paragraph rejection.

On pages 4-9 of the final Office Action, claims 1, 2, 6-8, and 13-16 were rejected under 35 U.S.C. §102(b) as being anticipated by U.S. Patent No. 5,053,104 to Babu et al. ("Babu"); claim 14 was rejected under 35 U.S.C. §103(a) as being unpatentable over Babu; and claims 17-18 and 20-25 were rejected under 35 U.S.C. §103(a) as being

unpatentable over Babu in view of U.S. Patent No. 5,919,332 to Koshiishi et al. (“Koshiishi”). Applicants respectfully traverse these rejections.

None of the cited references, whether cited under Section 102(b) or 103(a), discloses or suggests the invention claimed in each of as-amended independent claims 1, 7, 13, 17, 20, 21, and 23. For example, each of claims 1, 17, and 23 recites a plasma processing method including, among other aspects, wherein “oxygen is intermittently added into the process gas “ in combination with wherein “the fluorocarbon is continuously introduced into the process chamber during the entirety of the plasma process.” In another example, each of claims 7, 13, 17, and 23 recites a plasma processing method including, among other aspects, wherein “the oxygen added into the process gas is increased “ in combination with wherein “the fluorocarbon is continuously introduced into the process chamber during the entirety of the plasma process.” In a further example, each of claims 20 and 21 recites a plasma processing method including, among other aspects, wherein “said plasma process is implemented while increasing the oxygen added into the process gas “ in combination with wherein “the fluorocarbon is continuously introduced into the process chamber during the entirety of the plasma process.” None of the cited references discloses or suggests at least this aspect of each of independent claims 1, 7, 13, 17, 20, 21, and 23.

In rejecting the aforementioned independent claims over Babu, the final Office Action appears to be confusing two different embodiments in Babu. Page 3, lines 5-8 of the final Office Action points to the **first embodiment** in Babu including **a non-steady state condition** which varies “etchant gas competition [sic] between organohalide-contained and non-organohalide containing by alternating pulses of the etchant gas

composition.” (Col. 3, lines 50-56). Accordingly, these portions in Babu disclose that at certain points in the plasma process, organohalide-containing gas is not introduced into the etchant gas composition. Accordingly, this embodiment of Babu at least do not disclose or suggest that “the fluorocarbon is continuously introduced into the process chamber during the entirety of the plasma process,” as set forth in each of independent claims 1, 7, 13, 17, 20, 21, and 23.

Page 4, lines 16-19 of the final Office Action then points to a second embodiment of Babu, completely different from the first embodiment, Babu including steady state etch data, where composition of the process gas, whether including flouorocarbons, oxygen, or both, is not varied at all. Accordingly, these portions of Babu discloses that the flouorocarbons, oxygen, or both, are constantly introduced into the etchant gas composition, and thus Babu at least do not disclose or suggest that “oxygen is intermittently added into the process gas” as recited in claims 1, 17, and 23, “the oxygen added into the process gas is increased,” as recited in claim 7, 13, 17, and 23, and “said plasma process is implemented while increasing the oxygen added into the process gas” as recited in claims 20 and 21.

Indeed, as the steady state portions of Babu are set forth for comparative purposes only, there is no example or embodiment in Babu that discloses the combination set forth in each of the aforementioned independent claims, for example, intermittently adding oxygen and continuously introducing flouorocarbons into the process chamber as set forth in claims 1, 17, and 23. If anything, Babu teaches against combining steps from the steady state and non-steady state portions, or using any steps from the steady state portions at all, as Babu discloses that “the use of non-steady state

conditions results in greatly increased etch rates as compared to conventional steady state operation.” (Col. 7, lines 33-36).

Furthermore, claims 5 and 14 each recites, among other aspects, a “relationship between a change occurring in the aspect ratio and a change occurring in the plasma is ascertained in advance and the oxygen added into the process gas is adjusted in conformance to the change in the plasma.” In rejecting claim 14, page 6 of the final Office Action asserts that “[i]t would have been obvious to one of ordinary skill at the time the invention was made to use known experimental methods of changing the aspect ratio and plasma composition in advance and adjusting the quantity of oxygen added into the process gas in proportion to the change in plasma in the Babu reference, including using applicants’ method as claimed in the present invention for the purpose of improving the plasma etching process.” (Applicants would like to note that claim 5 was not rejected in the final Office Action).

Moreover, claims 13, 17, 22, and 23 each recites, among other aspects, wherein the “oxygen added into the process gas is increased in proportion to an increase in an aspect ratio of a contact hole.” In rejecting claims 13, page 4 of the final Office Action asserts that “[s]ince Babu uses the same etchant and same method of etching a silicon oxide layer as in the claimed invention, then using Babu’s method in the same manner as the claimed invention would result in oxygen added into the process gas is increased in proportion to an increase in the aspect ration of a contact hole formed at said silicon oxide film layer.” (Applicants would like to note that this aspect was not addressed in the final Office Action in the rejection of claims 17, 22, and 23).

These are improper motivations for each of their respective sets of claims because neither motivation is clear and particular, as required by In re Dembiczak, 175 F.3d 994, 999 (Fed. Cir. 1999), nor found in the prior art, as required by In re Vaeck, 947 F.2d 488, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991). Indeed, the Examiner has not provided any evidence to support either the alleged motivation or the alleged disclosure of the claims. Instead, the Examiner has taken Babu, and used the present invention (as admitted in the final Office Actions), along with hindsight, as a roadmap to come to the obviousness rejection with no evidentiary basis. This is not a motivation at all, but is simply an impermissible conclusory statement that implementing Babu will allegedly result in the claimed invention, despite the fact that Babu does not disclose the claimed invention for at least the reasons set forth above.

Indeed, to the extent that the final Office Action is asserting that Babu inherently discloses the aspects of claims 5, 13, 14, 17, 22, and 23 as set forth above, the final Office Action has not met the burden required to establish such inherency. In particular, in establishing inherency, the fact that a certain result or characteristic may occur or be present in the prior art is not sufficient to establish the inherency of that result of characteristic. *In re Rijckaert*, 9 F.3d 1531, 1534, 28 U.S.P.Q.2d 1955, 1957 (Fed. Cir. 1993). "To establish inherency, the extrinsic evidence 'must make clear that missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.'" *In re Robertson*, 169 F.3d 743, 745, 49 U.S.P.Q.2d 1949, 1950-51 (Fed Cir. 1999) (citations omitted). As the final Office Action does not cite any evidence, extrinsic or otherwise, to show that the aspects of claims 5, 13, 14, 17, 22, and 23 set forth above are necessarily disclosed by

Babu, as again Babu does not disclose the claimed invention for at least the reasons set forth above, Applicants assert that the rejection of those claims is improper.

Accordingly, for at least these reasons, Applicants respectfully withdrawal of the Section 102(b) and 103(a) rejections.

Applicants further submit that claims 2, 5-6, 8, 12, 14-18, 22, and 24-25 depend from one of independent claims 1, 7, 13, 17, 20, 21, and 23, and are therefore allowable for at least the same reasons that each of those respective independent claims is allowable. In addition, at least some of the dependent claims recite unique combinations that are neither taught nor suggested by the cited reference, and therefore at least some also are separately patentable.

In view of the foregoing remarks, Applicants submit that this claimed invention, as amended, is neither anticipated nor rendered obvious in view of the prior art references cited against this application. Applicants therefore request the entry of this Amendment, the Examiner's reconsideration and reexamination of the application, and the timely allowance of the pending claims.

The Office Action contains characterizations of the claims and the related art with which Applicants do not necessarily agree. Unless expressly noted otherwise, Applicants decline to subscribe to any statement or characterization in the Office Action.

In discussing the specification, claims, abstract, and drawings in this Amendment, it is to be understood that Applicants are in no way intending to limit the scope of the claims to any exemplary embodiments described in the specification or abstract and/or shown in the drawings. Rather, Applicants are entitled to have the

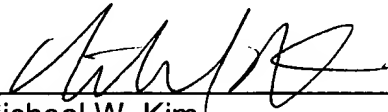
claims interpreted broadly, to the maximum extent permitted by statute, regulation, and applicable case law.

Please grant any extensions of time required to enter this Amendment and Request for Continued Examination and charge any additional required fees to our Deposit Account No. 06-0916.

Respectfully submitted,

FINNEGAN, HENDERSON, FARABOW,
GARRETT & DUNNER, L.L.P.

Dated: May 26, 2005

By: 
Michael W. Kim
Reg. No. 51,880